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Influence of Seasonality on the Frequency and Prognosis of Retroplacentary Hematoma at the Gabriel Touré University Hospital in Bamako (Mali)

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Abstract: This was a cross-sectional, retrospective study on the influence of seasonality on the frequency and prognosis of HRP at the Gabriel Touré University Hospital from January 1, 2020 to December 31, 2022, i.e. a duration of 3 years. This study allowed us to identify over a period of 3 years, 595 cases of HRP out of a total of 9447 deliveries, i.e. a frequency of 6.2%, with an increase in cases of HRP during the rainy season to 43.02%. The main reason for admission was metrorrhagia/pregnancy 83.03%. We found at the end of our study that the rainy season is a risk factor for the occurrence of HRP with a frequency of 43.02% during the rainy season, followed by the hot season at 30.25% and the cold season at 26.72%. Sher's HRP grade IIIA was the most diagnosed type at 76.63% and especially during the rainy season, with more complications of anemia and hemorrhagic shock at 73.61% and 14.96%. Caesarean section was performed in 80.2% of cases. We recorded 42 HRP-related maternal deaths or 7.05%, with a higher number during the rainy season at 59.52%. The fetal prognosis was poor with 89.06% fetal mortality. Retroplacental hematoma is a relatively common obstetric pathology. The rainy season would have an impact on its occurrence, but also on the maternal and fetal prognosis in our context.

Keywords: retroplacental hematoma, obstetric emergency, transfusion, maternal and neonatal death.

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INTRODUCTION

Retroplacental hematoma (RPH) is the formation of a blood clot between the placenta and the uterine wall, resulting in premature abruption of the normally inserted placenta (NIPPD) [1]. HRP occurs in particular from the second trimester of pregnancy. Its frequency according to studies conducted by Kanté SI [13] in 2020, Sangaré B [14] in 2021, Doubouya M [15] in 2013, and Seck K [7] in 2014 was 5.33% respectively; 0,81% ; 6.44% and 1.69% of deliveries.

Studies conducted in Dakar [10] and Niger [11], had observed the more frequent occurrence of HRP in the hot season and at the end of the dry season and a higher frequency during the rainy season with 7.2%. On the other hand, in France, 60% of HRPs occur during the cold season [12].

HRP is estimated to complicate between 0.25% and 1% of births in industrialized countries [1–4], and between 4.5% and 6% in developing countries [5,6].

HRP remains an unpredictable pathology despite the known risk factors: extreme age of maternity, multiparity, black race, history of caesarean section or HRP, thrombophilia, consumption of toxic substances, high blood pressure (hypertension), pathologies of pregnancy (gestational hypertension, pre-eclampsia, premature rupture of membranes (RPM)), abdominal trauma [1,7,8]. PRH sometimes occurs when these risk factors are absent; in 30%. The diagnosis of HRP is clinical, with classically: metrorrhagia (black blood), uterine contracture associated with sudden onset of pain. The paraclinical examination will find abnormalities in the fetal heart rhythm (FHR) and the hematoma can be visualized during the ultrasound [1]. HRP is associated with significant complications [2] which make it a vital emergency for the mother and the fetus. Maternal mortality is about 1.1 per 100,000 live births in industrialized countries, but can reach 6% in developing countries [1,9]. Perinatal mortality (including IUDs) is about 10 to 20% in European countries and can reach 60 to 75% in developing countries [2,5,6]. There have certainly been studies on

retroplacental hematoma in Mali; however, none of them had looked at the influence of seasonality on the incidence and prognosis of this condition. Indeed, our country has roughly three major seasons: cold, hot and rainy. These seasons could affect the clinical expression and prognosis of diseases. Indeed, in a study on HELLP syndrome, a condition like HRP, which is a complication of preeclampsia, Sanogo [29] had observed an influence of the seasons on its occurrence. These findings have led us to postulate that such influences could be observed on HRP and deserve that primary data can be generated before considering prospective cohorts. This is what motivated the present work at the Gabriel Touré University Hospital, which houses the only level III public maternity hospital in the country and whose structure of obstetric admissions reveals a statistically significant representation of all levels of the health pyramid.

Objectives

The aim was to evaluate the influence of seasonality on the frequency and prognosis of retroplacental hematoma.

MATERIALS AND METHODS

It was a cross-sectional study, from January 1, 2020 to December 31, 2022, i.e. a period of 3 years. **The study population:** The study population was made up of all pregnant or parturient women admitted to the emergency department and cared for in the maternity ward of the Gabriel Toure University Hospital, during the years 2020, 2021, 2022. **Inclusion criteria**: the files of all admitted pregnant women whose data conclude the diagnosis of retroplacental hematoma. **Non-inclusion criteria**: the files of pregnant women who do not present or the data do not conclude a retroplacental hematoma. Cases of HRP not treated in the department. **Sampling technique:** We carried out an exhaustive sampling taking into account all cases of Retroplacental Hematoma (RPH) that met our inclusion criteria. **The course of the study:** a database was entered and set up in the department under the supervision of the co-director obstetrician-gynecologist. This database is designed to review the main aspects of the pathology being studied. Sufficiently informed according to well-archived obstetric records, this database allowed us to make analyses and perspectives on the seasonality of retroplacental hematoma. **Data collection:** the study was supported by an obstetrical database including all obstetric admissions. It is a database that takes into account quantitative and qualitative variables relating to the identity of the pregnant woman, her history, the course of pregnancy and childbirth, the fate of the mother and her newborn, and the types of complications. The database was completed from obstetric records, delivery registers, ANC records, operating room report registers, maternal death registers. **The data collection technique:** The data was extracted from the different media by simple reading. The variables to be reported included socio-demographic characteristics (grade of study, season, age of the woman, marital status, level of education, occupation, etc.); behavioural characteristics (prenatal follow-up, history of miscarriage, etc.); family and obstetric history (family history of hypertension and diabetes, parity, gestationity, etc.), clinical data (maternal-fetal status, metrorrhagia, clot, cup, diagnosis and grade, type of complication, creatinine, renal failure, type of hypertension, etc.); and data on pregnancy outcomes (maternal and neonatal deaths, route of delivery, indications for caesarean section, maternal-fetal prognosis, etc.). The data were double-entered into SPSS version 20. The quality of the data in the obstetric records was ensured, since each of these records was discussed and corrected during the daily staff of the department, carried out by at least one of the senior gynecologists. **Data analysis and processing:** our dependent variable was the HRP in relation to seasonality, the different classes of which we defined and gave according to Sher and Pagé [36].

Operational definitions: **the SHER classification.** It is currently the most used, because it is more practical. It distinguishes three grades of increasing severity: **Grade I** : simple metrorrhagia, the diagnosis is retrospective. **Grade II** : There are clinical signs but the child is alive. **Grade III** : there are clinical signs and fetal death. **Grade III a** : no bleeding disorders. **Grade III b** : coagulation disorders. The main prognosis elements that we have retained are defined below: **Maternal mortality** : has been defined according to the WHO definition as any death of a woman occurring during the pregnancy-puerperal period or within 42 days after the termination of the pregnancy. **Stillbirth** : Defined as an Apgar score of zero at the first minute. **Perinatal mortality** : has been defined according to the Dictionary of Gynecology as all deaths of a child born alive and died before the 7th day of life. The analysis and processing were carried out according to the variables elaborated on the survey sheet, and taking into account the 3 seasons of the year, distributed as follows: the hot season: which extends from March to June. The rainy season: which extends from June to October. The cold season: which extends from November to February.

The general condition was assessed by the Karnofsky index:

- Judge good if patient able to carry out a normal activity = (I K is between 100 to 80%);
- Fair if patient, unable to work, to carry out activity; need for care = (IK is between 70 and 50%)
- Bad if unable to provide for oneself, need care and help; agonizing= (IK is between 40 and 1%); Died at 0%

The first step of our analysis was to assess the evolution of the prevalence of HRP according to the years and

months of admission, descriptive statistics were used. The difference in HRP prevalences across years and seasons was assessed using Pearson's Chi-square test (Objective 1). Descriptive statistics were also used to analyze sociodemographic, clinical and obstetric characteristics as well as trends in maternal and perinatal deaths (Objectives 2, 3). The Cochran-Armitage test was used to calculate the trend p-value. This test is generally used in the analysis of categorical variables when the goal is to assess the presence of an association between a dependent variable with two categories and an ordinal variable with several categories. It is a modified test of Pearson's Chi-square. For the study of risk factors, an exhaustive review of the literature was carried out to identify all the determinants or risk factors of HRP [36], as well as those influencing the occurrence of maternal deaths [37] and perinatal deaths. For the identification of risk factors, a multivariate logistic regression model was used to assess the independent association of the different potential risk factors for HRP. To obtain the most parsimonious model (model with few variables with good predictive power), an initial selection of the variables to be included in the multivariate model was made using univariate analyses with a high statistical threshold (p-value ≤ 0.2). The assessment of factors influencing maternal morbidity has been based primarily on the main complications of HRP reported in the literature [36]. Descriptive statistics (frequencies) were calculated. A Pearson chi-square test was used to identify factors that influence the prognosis of maternal death during HRP. In addition, a Fisher's exact test was also used for all situations where at least a theoretical number of less than 5 was observed.

Factors influencing the prognosis of perinatal death were assessed using polytomous logistic regression (Aim 3). The polytomous logistic regression model is a simple extension of the logistic regression model. This regression is well suited for multi-level categorical or ordinal dependent variables.

RESULTS

Frequency

During the study period, we collected 595 cases of HRP out of 9447 deliveries in the maternity ward; i.e. a frequency of 6.2%. We have seen a gradual increase in the frequency of HRP cases, i.e. 27.7% in 2020, 33.4% in 2021, and 38.8% in 2022. Tables 1 and 2 summarize the aspects of frequency.

Table 1: Annual distribution of the number of deliveries and HRPs

Years	Total number of deliveries	Number of cases of HRP	Percentage
2020	3119	165	05,29%
2021	3147	199	06,32%
2022	3181	231	07,26%
Total	9447	595	06,29%

Table I: Seasonal Distribution of Deliveries and PRH Cases

Seasons of the year 2020-2022	Total number of deliveries this season	Staff	Frequency of HRP during the season
Cold season	2117	159	26,72%
Hot season	2146	180	30,25%
Rainy season	**5183**	**256**	**43,02%**
Total	9447	595	100%

Ki-2 test=

Sociodemographic characteristics and obstetric history of patients with HRP

Among patients diagnosed with HRP, were generally aged 19 to 34 years (≥ 71% of cases), married (≥ 96% of cases) and housewives (78.6%). During the 3 seasons, a high proportion of women in the HRP cases had an ATCD of two or more and a pregnancy greater than 4, ATCD of hypertension in more than 1/4 of the cases and HRP in more than 4% of cases. These socio-demographic characteristics are summarized in Table 3.

Table 3: Sociodemographic characteristics and obstetrical history

Variables measured	Study Year Season		
	Cold season N (%) 159	**Hot season N (%) 180**	**Rainy season N (%) 256**
Age of patients ≤ 18 years old	10 (06,28)	10 (05,55)	19 (07,42)
19 - 34 years old	115 (72,32)	125 (69,44)	185 (72,26)
35 - 45 years old	34 (21,38)	45 (25,00)	52 (20,31)

Profession Official	8 (05,03)	7 (03,88)	17 (06,64)
Housewife	125 (78,61)	148 (82,22)	196 (76,56)
Student	10 (06,28)	5 (02,77)	13 (05,07)
Merchant	15 (09,43)	20 (11,11)	30 (11,71)
Other	1 (00,62)	0 (00,00)	0 (00,00)
Marital status Bride	154 (96,85)	176 (97,77)	245 (95,70)
Bachelor	4 (02,51)	4 (02,22)	11 (04,29)
Divorcee	1 (00,62)	0 (00,00)	0 (00,00)
Level of education Not in school	97(61,00)	105 (58,33)	135 (52,73)
Primary	35 (22,01)	50 (27,77)	64 (25,00)
Secondary	16 (10,06)	18 (10,00)	43 (16,79)
Madrasah	4 (02,51)	2 (01,11)	3 (01,17)
Upper	7 (04,40)	5 (02,77)	11 (04,29)
Medical ATCD HTA	35 (22,01)	38 (21,11)	52 (20,31)
Diabetes	0 (00,00)	4 (02,22)	0 (00,00)
Hemoglobinopathy	0 (00,00)	0 (00,00)	3 (01,17)
Asthma	2 (01,25)	0 (00,00)	0 (00,00)
Systemic disease	0 (00,00)	0 (00,00)	1 (00,39)
None	122 (76,72)	138 (76,66)	200 (78,12)
Parity Nulliparous	29 (18,23)	29 (16,11)	40 (15,62)
Primiparous	13 (08,17)	22 (12,22)	35 (13,67)
Paucipare	27 (16,98)	26 (14,44)	56 (21,87)
Multiparous	90 (56,60)	103 (57,22)	125 (48,82)
ATCD Abortion No	127 (79,87)	153 (85,00)	209 (81,64)
Yes	32 (20,12)	27 (15,00)	47 (18,35)
HRP ATCD Yes	8 (05,03)	7 (03,88)	14 (05,46)
No	151 (94,96)	173 (96,11)	242 (94,53)
Gestational age 28 -p 32NT	60 (37,73)	50 (27,77)	75 (29,29)
33 - 36NT	41 (25,78)	60 (33,33)	76 (29,68)
> = 37SA	55 (34,59)	68 (37,77)	101 (39,45)
24 - 27NT	3 (01,88)	2 (01,11)	4 (01,56)
ANC No	26 (16,35)	27 (15,00)	37 (14,45)
< Three	64 (40,25)	89 (49,44)	115 (44,92)
>= Three	69 (43,39)	64 (35,55)	104 (40,62)

The clinical and paraclinical aspects of patients according to the seasons

We observed that in all three seasons, the main reason for admission of women was metrorrhagia (≥ 83% of PRH cases). A large proportion of the women had a poor general condition with a Karnofsky index < 70%. However, these women had systolic hypertension ≥ 140 mm Hg as well as diastolic hypertension ≥ 90 mm Hg (≥ 56% of cases). Finally, during the three seasons, women had more Sher grade IIIA from the HRP with a higher proportion during the rainy season (≥76% of cases). Of these women, < 1% had kidney failure. Regardless of the class of HRP and the season, the caesarean section rate was over 80%. Table 4 summarizes the key findings of clinical characteristics by women's seasonality.

Table 4: Clinical, paraclinical and treatment aspects of PRH cases

Variables measured	**Study Year Season**		
	Cold season N (%) 159	**Hot season N (%) 180**	**Rainy season N (%) 256**

Reason for admission			
Abdominal pain/pregnancy	1 (00,62)	1 (00,55)	4 (01,56)
CUD/ pregnancy	4 (02,51)	2 (01,11)	12 (04,68)
Metrorrhagia/pregnancy	130 (81,76)	153 (85,00)	211(82,42)
Hypertension/ pregnancy	19 (11,94)	22 (12,22)	25 (09,76)
Hemorrhagic shock	0 (00,00)	1 (00,55)	1 (00,39)
Anemia/pregnancy	5 (03,14)	1 (00,55)	3 (01,17)
General condition / IK			
Karnofsky >=80%	27 (16,98)	39 (21,66)	24 (09,37)
Karnofsky 70 - 50%	106 (66,66)	110 (61,11)	166(64,84)
Karnofsky <= 40%	26 (16,35)	31 (17,22)	66 (25,78)
PA on admission			
SBP & D ≥ 140/90 mmhg	88 (55,34)	104 (57,77)	142(55,46)
PAS and D 139/89 - 100/60 Mmhg	47 (29,55)	57 (31,66)	76 (29,68)
SBP & D ≤ 99/59 mmHg	24 (15,09)	19 (10,55)	38 (14,84)
Sher Rank			
HRP grade I de Sher	1 (00,62)	2 (01,11)	2 (00,78)
HRP grade II de Sher	24 (15,09)	27 (15,00)	28 (10,93)
Sher's HRP grade IIIA	125 (78,61)	135 (75,00)	196 (76,5)
HRP grade IIIB de Sher	9 (05,66)	16 (08,88)	30 (11,71)
Complications			
Anaemia	123 (77,35)	136 (75,55)	179(69,92)
Hemorrhage due to uterine atony	0 (00,00)	4 (02,22)	1 (00, 39)
Bleeding disorder	10 (06,28)	17 (09,44)	32 (12,50)
Shock Kidney	1 (00,62)	1 (00,55)	1 (00,39)
Renal impairment	0 (00,00)	0 (00,00)	1 (00,39)
Hemorrhagic shock	25 (15,72)	22 (12,22)	42 (16,40)
Hemoglobin levels			
< 7g/dl	108 (67,92)	128 (71,11)	181(70,70)
7-10g/dl	49 (30,81)	48 (26,66)	71 (27,73)
≥ 11g/dl	2 (01,25)	4 (02,22)	4 (01,56)
Creatinine			
< 53µmol/l	89 (55,97)	101 (56,11)	138(53,90)
53µmol/l - 115µmol/l	54 (33,96)	71 (39,44)	98 (38,28)
> 115µmol/l	16 (10,06)	8 (04,44)	20 (07,81)
Route of delivery			
Low Lane	26 (16,35)	46 (25,55)	46 (17,96)
Caesarean section	133 (83,64)	134 (74,44)	210(82,03)

Prevalence of risk factors by season

Risk factors for HRP

We note an increase in the percentage of all risk factors during the rainy season with a non-negligible rate of multiparous to 39.3% in the same season. Associations between key risk factors and the prevalence of HRP are summarized in Table 5.

Table 5: Univariate analysis of risk factors for HRP according to the logistic regression model

Risk factors for HRP	GOLD (CI=95%)	P- Value
Seasons		
Hot season	0,448(0,106-23,172)	0,745
Cold season	0,890(0,253-23,471)	0,441
Rainy season	1,00	.
Age ≤ 18 years old	-1,165(0,027-3,657)	0,354
19 – 34 years old	-0,496(0,231-1,604)	0,316
> 35 years old	1,00	.
Medical ATCD HTA	-1,398(0,01-4,312)	0,338
Diabetes	-0,499(0,00)	1,000
Hemoglobinopathy	24,625(0,00)	0,997
Asthma	-1,556(0,211-0,211)	.
Systemic disease	34,398(868,9-868,9)	.
Other	1,00	.
Parity Nulliparous	1,291(0,00)	1,000
Primiparous	1,673(1,186-23,945)	0,029
Paucipare	0,679(0,865-4,496)	,106
Multiparous	1,00	.
Interreproductive intervals < 11 months	2,581(0,00)	0,999
12 – 23 months	-13,277(0,00)	0,996
24 – 59 months	-,670(0,00)	1,000
>60 months	11,612(0,00)	0,998
Other	1,00	.
HRP ATCD Yes	3,028(0,493-864,24)	0,112
No	1,00	.
Profession Officials	-47,992(0,00)	0,955
Housewives	-37,651(3,023-6,55)	0,000
Student	-35,225(1,011-2,506)	0,000
Shopping	-36,360(1,618-1,618)	.
Other	1,00	.
SBP and Diastolic ≥140/90mmHg	0,154(0,443-3,070)	0,756
139/89 – 100/60 mmHg	-1,104(0,134-0,823)	0,017
< 99/59 mmgh	1,00	.

OR= Odd ratio, CI=95% confidence interval, Risk factors for maternal deaths during PRH

Table 6: Factors influencing the prognosis of maternal deaths during HRP according to the bivariate model of the Fisher exact test and the T test

Indeterminate variables	Maternal prognosis		-P Value
	Living N (%) 553	**Deceased N (%) 42**	
Seasons Cold season	150 (27,12)	9 (21,42)	0,073
Hot season	172 (31,1)	8 (19,04)	
Rainy season	231(41,77)	25 (59,52)	

Age ≤ 18 years old	39 (07,05)	0 (0,00)	0,083
19 - 34 years old	396 (71,6)	29 (69,04)	
35 - 45 years old	118 (21,33)	13 (30,95)	
Parity Nulliparous	97 (17,54)	1(02,28)	0,180
Primiparous	70 (12,63)	0(00)	
Paucipare	105 (18,98)	4 (09,52)	
Multiparous	281(50,81)	37(88,09)	
Age of pregnancy 28 - 32NT	178 (03,21)	7 (16,66)	0,084
33 - 36NT	162 (29,29)	15 (35,71)	
> = 37SA	206 (37,25)	18 (42,85)	
24 - 27NT	7 (01,26)	2 (04,76)	
General condition at admission Karnofsky >=80%	90 (16,27)	0 (00)	0,327
Karnofsky 70 - 50%	372 (67,26)	10 (23,8)	
Karnofsky <= 40%	91 (16,45)	32 (76,19)	
SBP and Diastolic on Admission SBP & D≥140/90 mmHg	325 (58,77)	9 (21,42)	0,263
PAS and D 139/89 - 100/60mmhg	167 (30,19)	13 (30,95)	
SBP & D ≤99/59mmhg	61 (11,03)	20 (47,61)	
HRP Sher Rank HRP grade I de Sher	5 (00,9)	0 (00)	0,268
HRP grade II de Sher	78 (14,1)	1 (02,38)	
Sher's HRP grade IIIA	435 (78,66)	21 (5,0)	
HRP grade IIIB de Sher	35 (06,32)	20 (47,61)	
Hemoglobin levels < 7g/dl	376 (67,99)	41 (97,61)	-0,16
7-10g/dl	167 (30,19)	1 (02,38)	
>= 11g/dl	10 (01,8)	0 (00)	
Creatinine < 53µmol/l	324 (58,58)	4 (09,52)	0,24
53µmol/l - 115µmol/l	192 (34,71)	31 (73,8)	
> 115µmol/l	37 (06,69)	7 (16,66)	
Route of delivery Low Lane	111(20,07)	7 (16,66)	0,022
Caesarean section	442 (79,92)	35 (83,33)	

Perinatal prognosis

Table 7: Risk factors influencing stillbirth during HRP according to the polytomous regression model

Explanatory variables	N-born alive GOLD (CI%)	Value - P	Fresh stillbirth GOLD (CI%)	Value - P
Seasons				
Hot season	1,592(0,00)	1,000	-0,144(0,00)	1,000
Cold season	27,119(0,00)	0,997	26,760(0,00)	0,997
Rainy season	1,000	.	1,000	.
Age ≤ 18 years old	0,759(0,00)	1,000	0,710(0,00)	1,000
19 – 34 years old	4,548(0,00)	0,999	5,514(0,00)	0,999
≥35	1,000	.	1,000	.
Parity Nulliparous	-0,575(0,00)	1,000	-0,675(0,00)	1,000

Primiparous	2,323(0,00)	1,000	0,672(0,00)	1,000
Paucipare	27,130(0,00)	0,998	27,479(0,00)	0,998
Multiparous	1,000	.	1,000	.
SBP and Diastolic >140/90 mmHg	8,126(0,00)	0,999	-5,435(0,00)	1,000
139/89 – 100/60 mmHg	-14,613(0,00)	0,999	-29,450(0,00)	0,997
<99/59 mmHg	1,000	.	1,00	.
Number of ANCs No	4,465(0,00)	1,000	3,549(0,00)	1,000
≤ 2	6,204(0,00)	0,999	4,718(0,00)	1,000
≥ 3	1,000	.	1,000	.
Route of delivery Low Lane	0,792(0,00)	1,000	3,195(0,00)	1,000
Caesarean section	1,000	.	1,000	.
Sher Rank Grade I de Sher	-18,136(0,00)	1,000	-45,190(0,00)	0,999
Grade II de Sher	7,483(43,9-71,6)	0,000	-1,101(0,3-0,3)	.
Grade IIIA d Sher	-4,045(0,00)	0,999	-2,263(0,00)	1,000
Grade IIIB d Sher	1,000	.	.	.
Admission method Coming of her own accord	25,463(2681,6-4884,1)	0,000	23,224(121,5-121,5)	.
Evacuated/Csref	33,332(0,00)	0,990	30,945	0,991

OR= SDG Ratio, CI= confidence interval

DISCUSSION

Methodological approach

This was a cross-sectional, retrospective study. We reviewed the literature to identify the main variables that allow us to take stock of the influence of seasonality on the frequency and prognosis of HRP.

We were confronted with certain difficulties of missing data on certain files. These difficulties did not have an impact on our results, since they were corrected by cross-referencing the different sources of collection. **Frequency:** we find in our study an overall frequency of HRP of 6.2% out of 9447 deliveries. This frequency is much higher than that of B. Sangaré in 2021 at the CSRef C.II, which had a frequency of 0.87% [14]. Our frequency is comparable to that of a study in Senegal which had a frequency of HRP of 6.05% [21].

In Europe: In France, the frequency varies between 0.25% and 1% [22]. In the USA it varies between 0.6% and 1% [23]. We found a higher frequency of HRP during the rainy season at 43.02%; The same observation was made in the study of **Nayama M and Col in Niger in 2017** [11], but with a lower percentage than ours at 7.2%. This same frequency found according to our study is opposite to that of **Diallo D** and **Col in Dakar** [10] and that of **Hammer MT and Coll in France** [12], which had found a higher frequency of HRP during the hot and cold seasons, respectively. This difference may be due to the difference in the seasonal times of these countries and the length and size of our larger sample. At the end of these results, it can be said that the rainy season with these temperature variations would have an impact on spasm and vascular flow (spiral arterioles); hence the more frequent occurrence of HRP. This same observation has been made in various cross-sectional studies conducted in Niger, Dakar and France [10,11, 12].

Socio-demographic characteristics

The average age of patients most affected by HRP according to our study was 28 years with extremes of 15 – 45 years. According to **Kilani K** [24] in Morocco**, Haidara A** [9] who had found a higher HRP peak between the ages of 20 and 30. Our results are close to or comparable to those of different studies; which are more frequent in multiparous people, of which the one in our study represented 53.4%. This could be explained by the fact that this period corresponds to the most active phase of a woman's genital life. The most classic circumstance of the occurrence of HRP is that of gestational hypertension and more particularly pre-eclampsia. Indeed, it is found in 40 to 50% of NIPPs. In our study, the context of gestational hypertension was found in 56.13% of cases, this rate is slightly above the range. On the other hand, this rate is close to those of **Kanta I S** [13]and **Maïga M** [25], which had found

59.6% and 63% respectively, this difference could be explained by the size of our sample. Our study found a recurrence rate of HRP of 4.87%. Our result is lower but confirms the study of **Kilani K**. [24], which showed that HRP has a tendency to repetition. Women who have already presented a HRP table would have a 10% chance of seeing the accident happen again. Housewives were mainly represented with 78.8% of HRP cases. Sangaré B [14] found 82.1%, slightly higher than ours**.** In our study, 5.4% of patients had an ATCD of at least 2 abortions and 62% had no ATCD, MFIU or child death. We find among the pregnant women surveyed that 60.2% had performed less than 3 ANCs and 15.1% had achieved none. This rate is lower than that of **Doubouya M** [15] and that of **Dao SZ** [26], which noted 40.65% and 45% of pregnant women who had not achieved any ANC, respectively. We note an increase in the percentage of all risk factors during the rainy season with a non-negligible rate of multiparous to 39.3% in the same season.

Clinical and paraclinical data in relation to seasonality:

Pregnant women presented in 83.02% of cases with metrorrhagia, with more cases of Sher's grade IIIA HRP diagnosed at 76.63% during the rainy season, **with a Chi2= 6.1 and ddl= 6, P= 0.40.** Our results are comparable to that of **Nayama M** [11], which found the classic triad: uterine hypertonia, absence of BCF and metrorrhagia in 89.7% of patients. On admission, 20.67% of patients had a poor general condition with a Karnofsky index ≤ 40% to 25.78% during the rainy season. More than the majority of pregnant women had hypertension on admission, i.e. 58.15%. This result is higher than that of **Kanta** I [13] and **Maïga M** [25], which had found 35.6% and 26.8% respectively, but it remains close to that of **Haidara A** [9], which was at 63%. During our study, we found that HRP was more common during the rainy season and Sher grade IIIA was mostly diagnosed at **76,63%** to the same season with a **Chi2= 6.1 and ddl= 6, P=0.40.** This result is comparable **at** that of **Nayama M** [11], which found not only a higher frequency of HRP during the rainy season, but also a higher level of Grade III HRP at **35,6%.**

Anemia, hemorrhagic shock and coagulation disorders were the most common complications during the rainy season with 73.61%; 14.95% and 09.91%; **Chi-2=13.5** and **ddl=10, P=0.19**, respectively. Hyper creatinine in **37.48%** with hourly diuresis < 20ml, of which 13.10% are cases of renal failure.

Maternal-fetal prognosis in relation to the season

In our series, the evolution of the maternal condition was favourable in the majority of cases.

We have recorded **42 deaths** HRP-related maternal or **7,05%**, with a higher number during the rainy season at 59.52% with **a Chi-2=5.2 and a ddl=2, P=0.07.** In these cases: These were pregnant women in poor general condition at Scher grade III with severe anaemia and in whom coagulation disorders had set in and renal failure. This figure is higher than those of Kanta I S. [13] in Malifrom Kilani K. [24] in Moroccofrom Diallo D *et al*. [10] in Senegal and that of Ngathiam M. [27] in Burkina Faso, which found 5.7%, 1.39%, 6.6% and 4.5% respectively. The high rate of maternal deaths in our series could be explained by: the delay in consultation, diagnosis and care, the problem related to the availability of blood products in our structures, and the study period. The maternal prognosis is related to the severity of the HRP and the duration of the hemorrhage course, but also to the season according to our study.

Early diagnosis, rapid evacuation of the uterus and transfusion improve the prognosis.

The fetal prognosis is very guarded because we have recorded **10,94%** of newborns alive at birth, and **89,06%** fetal mortality, especially during the rainy season. This rate is related to the severity of the clinical picture itself due to the delay in diagnosis. This rate is higher than that of Granito-Martinez M [22], which found 24.64% fetal mortality in France, and also to those of Nayama M [11], Haidara A [9], Ngatiam M [27] and Doubouya M [15], which recovered 75.77% respectively; 70% ; 74.1% and 83.56% fetal death. The rate of fetal death depends on the degree of placental abruption and the weight of the clots [28]. Caesarean section appears to be the fundamental act of saving the fetus when HRP occurs at a gestational age of viability and in case of early diagnosis and often for maternal rescue. This caesarean section was performed in **80,17**% of cases.

CONCLUSION

Retroplacental hematoma is a relatively common obstetric pathology. The rainy season would have an impact on its occurrence, but also on the maternal and fetal prognosis, in our context.

Conflict of interest: none.

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